REMARKS

Claims 1-10 are pending in the application and stand rejected. Claim 1 has been amended. Reconsideration and allowance of Claims 1-10 in view of the above amendment and following remarks is respectfully requested.

Rejection of Claims 1-10 under 35 U.S.C. §103(a)

Claims 1-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over EP 1202365, issued to Yamaguchi et al. (Yamaguchi) in view of U.S. Patent No. 6,565,763, issued to Asakawa et al. (Asakawa). Withdrawal of the rejection is respectfully requested for the following reasons.

Claim 1 has been amended to clarify that the third polymer, which is a compound of the porous substrate, includes a carbon-carbon double bond.

As amended, Claim 1 relates to an electrolyte membrane having a porous substrate with the following characteristics:

(a) a porous substrate having pores that are filled with a first polymer having proton conductivity that imparts proton conductivity to the electrolyte membrane, and

(b) a porous substrate comprised of

(i) a second polymer that is a crosslinked polyolefin, and

(ii) a third polymer having a carbon-carbon double bond.

Claims 2-10 depend from Claim 1.

The Yamaguchi reference fails to disclose a crosslinked polyolefin (second polymer) and a carbon-carbon double bond containing polymer (third polymer) as required in the claimed invention.

First, the Yamaguchi reference does not teach a crosslinked polyolefin. The Yamaguchi reference discloses that the substrate of the membrane includes Teflon and polyimide. However, nowhere does the reference disclose a substrate that includes a crosslinked polyolefin.

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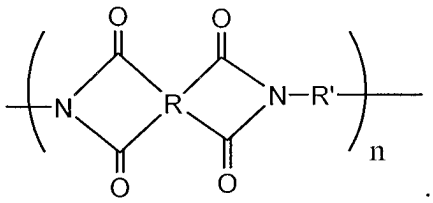
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

Furthermore, the Yamaguchi reference does not teach a third polymer having a carbon-carbon double bond in the molecule. The polyimide disclosed by the Yamaguchi reference has the following structure:



Claim 1 has been amended to clarify that the third polymer has a carbon-carbon double bond. The polyimide molecule disclosed by the Yamaguchi reference has carbon-oxygen double bonds, therefore does not satisfy the requirement in Claim 1.

The Asakawa reference does not teach a crosslinked polyolefin **and** a double bond containing polymer simultaneously.

The Asakawa reference does not teach a material simultaneously having a crosslinked polyolefin and a carbon-carbon double bond containing polymer. The Asakawa reference discloses a material made of a block copolymer or a graft copolymer. Those copolymers have two components: a decomposable polymer component and an indecomposable polymer component. According to Asakawa, the decomposable polymer may be polypropylene, polyisobutylene, and poly(α-methylstyrene) (Column 13, lines 59-54). Further, the reference discloses the following candidates for the indecomposable polymer: (1) polymers having a hydrogen atom at the α-position of the polymer chain, such as polyethylene, polystyrene, polyacrylic acid, polymethyl acrylate, polyacrylamide, and polymethyl vinyl ketone; (2) polymers having a double bond, such as 1,2-dibutadiene, which can be crosslinked by the energy beam, and (3) derivatives of polynorbornene and polycyclohexane (Column 14, lines 13-21). In the practice of the reference, the polyethylene with a hydrogen atom at the

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1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

α-position of the polymer chain or the double-bond containing polymer is crosslinked by the energy beam or heat to form a crosslinked indecomposable polymer. Before the crosslinking, Asakawa's copolymer may have a non-crosslinked polyethylene or a double-bond containing polymer; and after the crosslinking, Asakawa's copolymer contains, as the indecomposable polymer, crosslinked polyethylene or a crosslinked polymer resulting from the crosslinking of the double-bonds. Consequently, the carbon-carbon double bond would be destroyed to accomplish crosslinking in Asakawa's material. Therefore, the Asakawa's material does not simultaneously have a crosslinked polyolefin and a carbon-carbon double bond containing polymer.

Further, the Asakawa's porous material contains only one polymer. Before heating or irradiation, Asakawa's material contains a copolymer with two components: the decomposable block and the indecomposable block. After removal of the decomposable block, the material still only contains one polymer, the indecomposable polymer. Therefore, in contrast to the claimed invention, which requires two different types of polymers in the membrane substrate, the Asakawa's porous material contains only one polymer.

The combination of the teachings in the Yamaguchi reference and the Asakawa reference does not lead to the claimed invention.

The Yamaguchi reference fails to disclose either a crosslinked polyolefin (second polymer) or a carbon-carbon double bond containing polymer (third polymer), as required in the claimed invention. The Asakawa reference cannot cure Yamaguchi's defects by disclosing a material containing only one polymer. In addition, the Asakawa's material does not simultaneously have a crosslinked polyolefin and a carbon-carbon double bond containing polymer. Therefore, even if one skilled in the art combines the teaching of the Yamaguchi reference with that of the Asakawa reference, one still would not achieve the claimed invention,

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1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

i.e., a membrane with a substrate comprising a crosslinked polyolefin and a carbon-carbon double bond containing polymer.

Because the cited references do not teach or suggest the claimed invention, the claimed invention is nonobvious and patentable over the cited references. Withdrawal of the rejection is respectfully requested.

CONCLUSION

In view of above amendments and foregoing remarks, applicants believe that Claims 1-10 are in condition for allowance. If any issue remains that may be expeditiously addressed in a telephone interview, the Examiner is encouraged to telephone applicants' attorney at the number listed below.

Respectfully submitted,

CHRISTENSEN O'CONNOR
JOHNSON KINDNESS PLLC

George Rentoni
for Reg. No. 37,919

Jeffrey M. Sakoi
Registration No. 32,059
Direct Dial No. 206.695.1713

JMS:md

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS PLLC
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100